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ABSTRACT

An operational index of discrepancy between ability and achievement using the Wechsler Intelligence Scale for Children and the Peabody Individual Achievement Test (PIAT) was tested with 50 male and 10 female legally identified learning disabled (LD) children (mean age 9 years 2 months). Use of the index identified 74% of the males and 30% of the females as possibly LD for a total of 67% possibly LD identifications. Among the identified children, 93% had discrepantly low PIAT subtest scores in reading recognition, 88% in reading comprehension, 83% in spelling, and 52% in arithmetic. Results suggested that caution be exercised when classifying children, especially females, as LD. (Author/DB)

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An Operational Definition of Learning Disabilities (Cognitive Domain) Using WISC Full Scale IQ and Peabody Individual Achievement Test Scores

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Running Head: Operational Definition of LD Using the WISC IQ and the PIAT

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Abstract

An operational index of discrepancy to assist in identifying learning disabilities (LD) in the cognitive domain was derived using the Full Scale IQ, Wechsler Intelligence Scale for Children (Wechsler, 1949), and relevant subtest scores on the Peabody Individual Achievement Test (PIAT) (Dunn and Markwardt, 1970). The index was applied to all legally identified LD children (N=60) of a Michigan county who were in the LD program (1% of the total elementary school population of 6000 children). Of the 50 males and 10 females (mean age: 9 years 2 months; mean IQ: 91), the index identified 74% and 30% respectively as may be LD in the cognitive domain. This comprised 67% of the 60 children, or 2/3 of 1% of the total elementary school population. Of the 67% may be LD children, 93% had discrepantly low PIAT subtest scores in Reading Recognition, 88% in Reading Comprehension, 83% in Spelling, and 52% in Arithmetic. Considerable caution should be exercised when classifying children, especially females, as LD.

An Operational Definition of Learning Disabilities (Cognitive Domain) Using WISC Full Scale IQ and Peabody Individual Achievement Test Scores

In Michigan, as in other states, special educators, both at the local and state levels, have been attempting to define conditions known as learning disabilities (LD). Much of the problem of definition seems to lie in the difficulty of converting definitions based upon theoretical concepts for funding into specific quantified terms for practitioners of special education, e.g., directors, social workers, psychologists, speech correctionists, consultants, and teachers.

Leading authorities in the field have been unable to agree upon a definition, but practitioners are in even greater disagreement. Vaughan and Hodges (1973) allude to this dilemma when they state, "There exists no truly relevant standards for determining a definition of learning disabilities. Therefore, practitioners involved with handicapped children need to be the ones who determine a palatable standard definition" (p. 73).

Lack of an operational definition has caused many special and general educators to question whether children assessed as LD, are in fact, LD. Patricia Myers (Wiederholt, 1974), president of the Division for Children with Learning Disabilities, Council for

Exceptional Children, expresses her concern for definition, "I have a great fear about what is going on when you talk about learning disabilities. . . . there are great numbers of children being labeled LD who probably are not. In Texas this past year there has been a 200% increase in the number of LD children being placed in special education programs. Some school districts have almost 25% of their children at certain grade levels in LD programs" (pp. 510-511).

In Michigan, the LD are defined legally by the Michigan special education code (1973). The definition is as follows:

> Rule 13. "Learning disabled" means a person identified by an educational planning and placement committee, based upon a comprehensive evaluation by a school psychologist or certified psychologist or certified consulting psychologist or an evaluation by a neurologist, or equivalent medical examiner qualified to evaluate neurological dysfunction, and other pertinent information, as having all the following characteristics:
>
> (A) Disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculation.

(B) Manifestation of symptoms characterized by diagnostic labels such as perceptual handicap, brain injury, minimal brain dysfunction, dyslexia or aphasia.

(C) Development at less than the expected rate of age group in the cognitive, affective or psychomotor domains.

(D) Inability to function in regular education without supportive special education services.

(E) Unsatisfactory performance not found to be based on social, economic or cultural background. (p. 3)

The dilemma of how to proceed in order to measure the various defining characteristics expressed in sections A through E above still persists. How does one properly assess and subsequently properly classify children as LD? One of the basic principles of research is to define the variables operationally. Kerlinger (1973) states that an operational definition is one which ascribes meaning to a concept or construct by specifying the operations that must be performed in order to measure the concept. This study is concerned with defining operationally only that portion of Rule 13-C which states, "Development at less than the expected rate of age group in the cognitive. . . ." domain. What discrepancy index do we use to define operationally less than?

The Guidelines for special education programs and services for learning disabled (Michigan Department of Education, 1974) offer some clarification:

> Rule 13 (C) 1. If a student evidences deficits or lags in development and/or academic performance which cannot be accounted for by age and intellectual capacity, then he would be considered as functioning at less than the expected rate of his age group in the cognitive domain. (p. 94)

Although this is more specific, the question still remains as how to measure the "deficit or lag".

Several indices of discrepancy have been used by various practitioners. Johnson and Myklebust (1967) describe a common index that often is used. It requires that the child function academically at least one or more years below his expectancy level. Though useful as a quantitative guideline, they feel it has limitations, because 1 year below expectancy at 9 years of age is not comparable to 1 year below expectancy at 4 years of age, nor at 16 years of age. Instead, they advocate calculating a "Learning Quotient", or ratio of achievement to mental age, as a more rigorous index of discrepancy. They suggest this ratio should be 89 or less for children with IQ's of 90 or above. But they do not indicate an appropriate Learning Quotient for children with IQ's below 90.

In contrast, Bateman (1965) espouses the use of "common sense" as an index of discrepancy. Although she considers a child with LD to be one revealing a "significant" discrepancy between his estimated capability and what he is achieving, her position as to what constitutes significant is that no rigid criteria can be set, but that common

sense should be the prevailing guideline.

Both Johnson and Myklebust's Learning Quotient and Bateman's common sense indices of discrepancy were rejected, the latter because of its imprecision, and the former because many of the children in this study have IQ's of less than 90. We suggest measuring the discrepancy between intellectual capacity and academic performance by comparing the child's adjusted Mental Age (MA), based upon the Full Scale IQ on the Wechsler Intelligence Scale for Children (WISC) (Wechsler, 1949), with his relevant subtest scores on the Peabody Individual Achievement Test (PIAT) (Dunn and Markwardt, 1970). The Full Scale IQ was corrected to the lower limit of the standard error of measurement (SE_M) at the 95% level of confidence. The relevant PIAT subtest scores were Mathematics, Reading Recognition, Reading Comprehension, and Spelling. The General Information subtest score and the Total Test score were not deemed relevant to this study since they are not included in the Michigan definition of LD.

Purposes

The purposes of this study were (a) to develop an operational index of discrepancy between intellectual capacity and academic performance which would assist in identification of LD in the cognitive domain, and (b) to ascertain the effectiveness of this discrepancy index by applying it to all the children in a Michigan county who had been placed in a LD program by an educational planning and placement committee.

Method

Subjects

The subjects were all of the children (N=60) who had been placed in the seven elementary resource rooms for LD within a county of Michigan in September, 1974. This comprised 1% of the total elementary school population of 6,000 children. The 50 males and 10 females had a mean age of 9 years 2 months, with an age range of 6 years 2 months to 13 years 5 months. The mean IQ was 91, with a range from 63 to 124.

Procedure

The WISC and the PIAT were administered to each child. Selected demographic data were recorded on the face sheet of the PIAT Individual Record Booklet along with the PIAT scores, WISC Full Scale IQ, and the PIAT scores profile.

McCarthy and McCarthy (1969) state that the WISC is one of the most reliable and useful intelligence tests for use with children suspected of being LD, since it does not rely excessively upon visual-motor perceptual abilities. These abilities often are said to be impaired in children with LD. Further, they state that subtest scatter, which may be useful in remediation, is not useful as a diagnostic sign, since it does not always distinguish the child with LD from the child with other conditions, such as mental retardation.

In the PIAT Manual, the authors suggest that a subject's IQ "may provide an index of the approximate level at which one could

expect that subject to achieve" (Dunn and Markwardt, 1970, p. 13). This is accomplished by calculating the adjusted MA, using the formula adjusted MA = IQ / 100 x CA. Each child's CA and adjusted MA were computed and superimposed on his profile on the face sheet of the PIAT Individual Record Booklet.

The PIAT scores, as plotted on each child's profile, were compared visually with his adjusted MA. Using the common sense approach, if the profile shows one or more of the relevant subtest scores to be below his "potential", as defined by his adjusted MA, then he may be manifesting development at less than the expected rate of his age group in the cognitive domain.

However, using this method the question of the significance of the discrepancy is still maintained. By using Sattler's table (1974, p. 442), the appropriate multiple of the standard error of measurement for the Full Scale IQ at the 95% level of confidence was used to compute the lower limit of the adjusted MA, using the formula lower limit of adjusted MA = $(IQ-SE_M)$ / 100 x CA. The lower limit of the adjusted MA was superimposed on the profile of each child's PIAT Individual Record Booklet face sheet. Assuming the relevant PIAT subtest scores are valid, then any score which falls below the lower limit of the adjusted MA (calculated at the 95% level of confidence) may be considered an educationally significant discrepant score.

The 60 children were dichotomized into the following categories: (a) "may be LD"—an educationally significant discrepant score on

one or more relevant subtest(s) of the PIAT, or (b) "may not be LD"-- no educationally significant discrepant scores on any of the relevant PIAT subtests. The mean and range of the WISC Full Scale IQ were computed for each category. For those classified as may be LD, the discrepant subtest scores were analyzed and percentages computed.

Results and Discussion

Using the discrepancy index of this study as criterion, 40, or 67% of the 60 children were classified as may be LD, while 20, or 33% were classified as may not be LD. The 40 children constitute 2/3 of 1% of the total elementary school population. These data tend to support the contention of some (e.g., Myers [Wiederholdt. 1974]) that the LD category of special education is apt to be misinterpreted such that too many children seem to be eligible for this type of program.

Separating the children by sex, 37, or 74% of the males and 3, or 30% of the females were classified as may be LD. Conversely, 13, or 26% of the males and 7, or 70% of the females were classified as may not be LD. This suggests that unusual caution should be exercised when considering eligibility of females for LD programs.

Of the 40 children categorized as may be LD, 2, or 5% had 1 educationally significant low PIAT subtest score; 4, or 10% had 2 low subtest scores; 21, or 52% had 3 low subtest scores, while 13, or 33% had 4 educationally significant low subtest scores. This

raises the question as to whether children classified as LD are apt to have more than one academic disability.

Of the 40 children categorized as may be LD, 37, or 93% had educationally significant low scores in PIAT Reading Recognition; 35, or 88% had low scores in Reading Comprehension; 33, or 83% had low scores in Spelling; and 21, or 52% had low scores in Mathematics. This suggests that reading may be the most common deficiency of LD children, although mathematics is not uncommon, when it occurred low in over half of the children of this study.

Finally, for the 40 children categorized as may be LD, the mean WISC Full Scale IQ was 98 (range: 75-124). This was higher than the mean IQ of 83 (range: 63-100) for the 20 children categorized as may not be LD. This seems to support the contention of some definitions that normal or above normal intelligence is one of the several characteristics of LD children.

The authors were curious as to how the use of different lower limits of the adjusted MA would effect the proportion of children who would be categorized as may or may not be LD in the cognitive domain. Using the lower limit of the adjusted MA at the 68% level of confidence, 43, or 72% of the 60 children were classified as may be LD, while 17, or 28% were classified as may not be LD. The 43 children constitute about 7/10 of 1% of the total elementary school population. Using the obtained IQ's (with no correction for SE_M), 45, or 75% of the 60 children were classified as may be LD, while 15, or 25% were classified as may not be LD. The 45 children

constitute 3/4 of 1% of the total elementary school population.

In view of the purposes and findings of this study, it seems that two conclusions may be supported:

1. The discrepancy index developed in this research seems to function effectively as an objective base for identifying less than 1% of a given elementary school population as LD, in the cognitive domain.
2. Special education personnel responsible for classifying children as LD should exercise considerable caution, since data from this study indicate that 25% to 35% of the children measured were not LD in the cognitive domain.

Special educators responsible for the classification and placement of LD children may find the use of this study's discrepancy index helpful in establishing a more objective base for decision. The authors recommend that this study be replicated with similar subjects in other Michigan counties.

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